

## **Megafloral perturbation across the Enna Marine Zone in the Upper Silesian Basin attests to Late Mississippian (Serpukhovian) deglaciation and climate change**

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### **ABSTRACT**

A significant vegetational change occurs in the Late Mississippian (Serpukhovian, Namurian A) across the Enna Marine Zone (EMZ), Upper Silesian Basin, Czech Republic. All plant clades were impacted, including both spore-producing and seed-producing taxa; wetland taxa were unaffected. Similar vegetational responses are not identified elsewhere although, basinwide, thick marine zones (e.g., Barбора Marine Zone, BMZ) also developed at various times during the Serpukhovian. Examination of sedimentological and petrophysical (gamma-ray log) trends in both marine zones indicates that different mechanisms generated accommodation space during each interval. Placed in a genetic stratigraphic context, the EMZ records sedimentation in at least four (or more) genetic sequences, each equal in duration to individual 100-kyr cyclothem identified in the coalfield. Discrete maximum flooding surfaces (MFSs) with associated condensed sections and macrofaunas are prominent in distal areas and were identified using gamma-ray log responses. In contrast, the petrophysical expression of distal regions of the BMZ shows no strong positive gamma-log excursions interpreted as MFSs. Rather, this interval is a succession equal in duration to two cyclothem. The BMZ represents sedimentation in a glacial-interglacial cyclothem framework; in contrast, the EMZ represents accumulation under continued eustatic sea-level rise in response to southern hemisphere deglaciation and global warming. Late Mississippian vegetational response to paleoequatorial climate change is interpreted to represent a shift toward greater seasonality, with an increased number of dry months (monsoonal rainfall pattern?) resulting in statistically significant extinction or extirpation several million years prior to the onset of maximum glaciation and sea-level drawdown at the Mississippian–Pennsylvanian boundary.